



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/681,031	10/07/2003	Yan Borodovsky	Intel 10559-881001/P17483	2703
20985	7590	09/28/2006	EXAMINER	
FISH & RICHARDSON, PC P.O. BOX 1022 MINNEAPOLIS, MN 55440-1022			CHACKO DAVIS, DABORAH	
			ART UNIT	PAPER NUMBER
			1756	

DATE MAILED: 09/28/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/681,031

Applicant(s)

BORODOVSKY, YAN

Examiner

Daborah Chacko-Davis

Art Unit

1756

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 28 August 2006.  
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.  
4a) Of the above claim(s) 6-8 is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 1-5 and 9-20 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.  
10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date See Continuation Sheet.  
4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.  
5) ☐ Notice of Informal Patent Application  
6) ☐ Other: \_\_\_\_\_.

Continuation of Attachment(s) 3). Information Disclosure Statement(s) (PTO/SB/08), Paper No(s)/Mail Date  
:01/05,03/05,05/05,06/05,07/05,10/05,02/06,07/06,.

## **DETAILED ACTION**

### ***Election/Restrictions***

1. Applicant's election with traverse of Group I, claims 1-5, and 9-20, in the reply filed on August 28, 2006, is acknowledged. Claims 6-8, are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. The traversal is on the ground(s) that the examination of three additional claims, as part of a total of twenty claims, does not present a serious burden. This is not found persuasive because Group II (claims 6-8) is directed to a patentably distinct invention and requires a separate search.

The requirement is still deemed proper and is therefore made FINAL.

### ***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-3, 5, 9-13, and 20, are rejected under 35 U.S.C. 102(b) as being anticipated by EP 0915384 (Sugita et al., hereinafter referred to as Sugita).

Sugita, in [0018], [0019], [0020], [0021], [0022], [0023], [0038], [0064], [0065], [0066], [0091], [0092], discloses an interference exposure apparatus (first subsystem) that exposes a photoresist coated wafer to an interference exposure process in the apparatus to form a periodic pattern (line and space pattern), performing a second

Art Unit: 1756

exposure in a different apparatus (projection exposure system, a second subsystem) different from the interference exposure apparatus to form a pattern on the photoresist with a pitch twice as large as the first pitch (pitch of the interference pattern; and the second exposure breaking regularity or continuity of lines of the interference pattern). Sugita, in [0070], discloses that the second linewidth is greater than the first line width (claims 1, 2, 9). Sugita, in [0087], [0088], and in figure 16, discloses using a beam splitter (claim 3). Sugita, in [0083], and [0103], discloses that the second apparatus is a mask-based optical lithography tool (claim 5). Sugita, in [0113], [0114], [0116], discloses an alignment optical system (alignment sensor) that observes the alignment mark on the wafer for the interference pattern formed in the first exposure (in the interference exposure module), and observes the alignment mark on the wafer (with interference pattern formed) for the projection exposure process (second patterning module) performed on the exposed wafer (claim 10). Sugita, in [0115], [0118], and in figure 21, discloses a control system that enables the interference exposure apparatus (first patterning system) and the projection optical exposure apparatus (second patterning system, imprint system) to perform a first and second exposures respectively, and performing alignment using the alignment optical system between exposures, and projecting the exposure beam via a reticle (mask) and through the projection optics to form a second pattern (of a second linewidth) on the wafer positioned on the wafer stage (breaking the continuity of the lines or the regularity of the lines formed from the interference pattern) (claims 11-13, 20).

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claim 4, is rejected under 35 U.S.C. 103(a) as being unpatentable over EP 0915384 (Sugita et al., hereinafter referred to as Sugita) in view of U. S. Patent No. 6,946,666 (Saito et al., hereinafter referred to as Saito).

Sugita is discussed in paragraph no. 3.

The difference between the claims and Sugita is that Sugita does not disclose that the first subsystem is a diffraction grating (claim 4).

Saito, in col 23, lines 44-50, discloses that the interference exposure system (first exposure) employs a grating pattern of a known pitch (substantially equal pitch).

Therefore, it would be obvious to a skilled artisan to modify Sugita by employing the grating pattern as suggested by Saito because Saito, in col 23, lines 44-50, discloses that the interference fringes of the two light beams are recorded on the wafer based on the grating pattern provided in the interference exposure system, and Sugita in [0069], discloses that an exposure pattern of high resolution is formed due to the mixing of the dual-beam interference exposure and the projection exposure.

Art Unit: 1756

6. Claims 14-19, are rejected under 35 U.S.C. 103(a) as being unpatentable over EP 0915384 (Sugita et al., hereinafter referred to as Sugita) in view of U. S. Patent No. 5,041,361 (Tsuo).

Sugita is discussed in paragraph no. 3.

Sugita, in [0113], [0114], [0115], [0116], discloses an interference exposure apparatus to perform the first exposure, and a projection optical system (second exposure system) that illuminates the reticle and projects the patterned beam via the projection optics onto the wafer positioned on a wafer stage.

The difference between the claims and Sugita is that Sugita does not disclose that the second patterning module includes an electron beam tool (claim 14). Sugita does not disclose that the second patterning module includes a maskless module (claim 15). Sugita does not disclose that the maskless module is an optical direct write (claim 16). Sugita does not disclose that the maskless module is an electron beam direct write module (claim 17). Sugita does not disclose that the maskless module is an ion beam direct write module (claim 18). Sugita does not disclose that the second patterning module includes an X-ray projection system (claim 19).

Tsuo, in col 2, lines 59-68, in col 3, lines 1-12, and lines 36-42, in col 4, lines 18-21, discloses that the exposure apparatuses include an electron beam lithography tool, an X-ray lithography tool, and ion beam systems. Tsuo, in col 3, lines 1-5, in col 10, lines 25-30, discloses that the exposure system includes a maskless exposure system and includes a direct write module such as an ion beam module (ion beam source), or an electron beam module (focused electron beam).

Therefore, it would be obvious to a skilled artisan to modify Sugita by employing the exposure modules suggested by Tsuo because Tsuo, in col 4, lines 14-20, discloses that the using high energy sources such as X-rays, e-beams, and ion beams enables a resistless process to form circuit components directly in the substrate material and eliminates all the resist processing steps.

***Conclusion***

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daborah Chacko-Davis whose telephone number is (571) 272-1380. The examiner can normally be reached on M-F 9:30 - 6:00. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark F Huff can be reached on (571) 272-1385. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

dcd

September 11, 2006.

  
**JOHN A. MCPHERSON**  
**PRIMARY EXAMINER**